

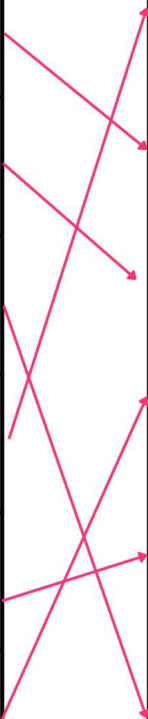
Episode 1: Why is Everything So Colourful?

Key Terms from the broadcast

During today's broadcast, we explored some BIG scientific ideas that help explain why coral reefs are so colourful and why that colour matters. From light absorption to ecological niches, scientists use specific vocabulary to describe what is happening on the reef. How well were you listening?

Draw a line between each keyword and its correct definition.

Keywords	Definitions
Biodiversity	Chemical reaction that produces light from within an organism's body
Ecological niche	All the different living organisms within a given area
Camouflage	A role or job an organism has in its ecosystem
Bioluminescence	Ability of an ecosystem or species to bounce back from negative environmental influence
Photic zone	Surface layer of the ocean where sunlight penetrates; top 500ft or so
Resilience	colour and/or patterns of an organism that helps it to blend in with the surrounding environment



Light and Colour in the Ocean

Light behaves differently in water than it does in air. As sunlight enters the ocean, different colours are absorbed and scattered at different depths. This is why reefs look vibrant in shallow water and blue in deeper water.

Use the word bank below to complete the sentences.

Word bank:

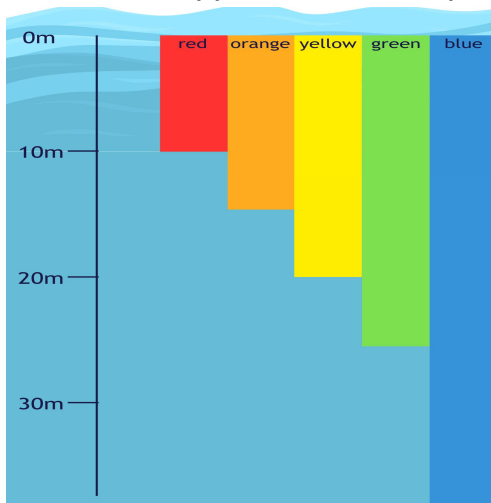
absorbed scattered red blue deeper photic

- When sunlight enters the ocean, some colours are absorbed more quickly than others.
- Red light disappears first.
- As you go deeper underwater, more colours are lost.
- Blue light travels the furthest in water.
- The sunlit layer of the ocean is called the photic zone.
- Light is also scattered in different directions as it moves through water.

Shade the depth at which a red fish would begin to appear dark or black.

10m

A red fish appears dark at depth because:



- Red wavelengths are absorbed very quickly in water
- At deeper depths there is little or no red light available
- Without red light to reflect, the fish cannot appear red
- It therefore looks dark or black to other organisms



Colour Adaptations on the Reef

Colour plays many important roles in reef ecosystems. During Reefs Go Live, we saw examples of fish that use colour to camouflage, warn predators, attract mates, or blend into their environment.

Match each marine organism to the reason it uses colour.

Marine organism	Why does it use colour?
Lionfish	Warning colours signal that it is venomous and dangerous to predators
Stoplight parrotfish (adult)	Bright colours help signal maturity and attract mates
Juvenile parrotfish	Different colour pattern helps avoid aggression from adult fish and provides camouflage
Silver open-water fish	Reflective silver scales mirror the surrounding water, helping them blend in
Squirrelfish	Red colour helps them remain hidden because red light disappears quickly underwater

Complete the statement:

Having many different colour strategies allows species to survive in different ways and reduce competition with each other.

This helps increase biodiversity because

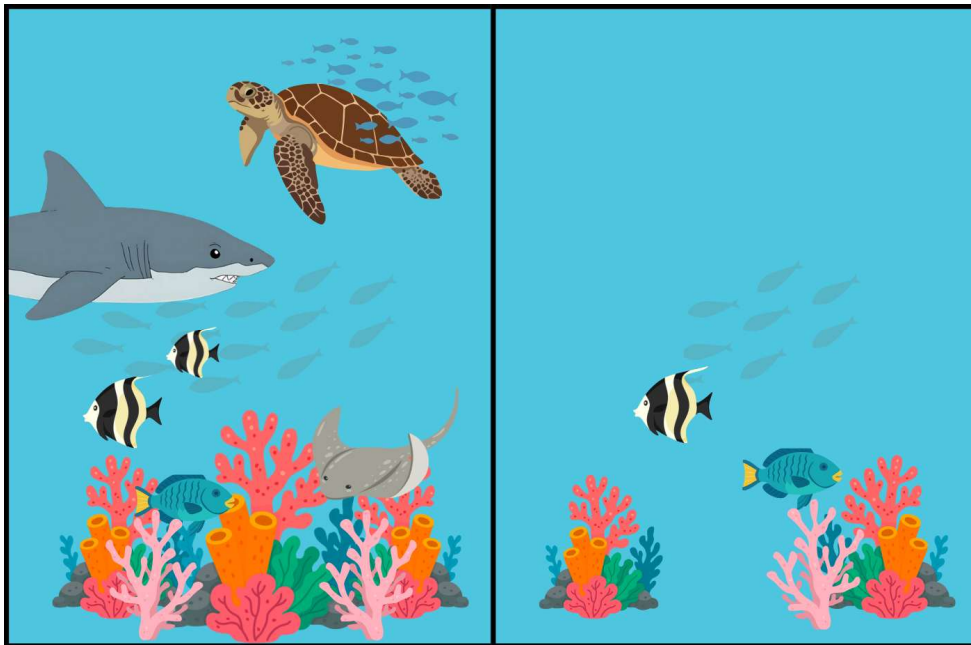
- Different strategies allow more species to coexist
- Species can occupy different ecological niches
- This creates a more balanced and complex ecosystem

Biodiversity in Action

Coral reefs support more than 25% of marine life despite covering less than 1% of the ocean floor. Scientists measure biodiversity by counting how many different species are present in an area.

Below are two reef survey images from different sites in Little Cayman.

(Note: exact species counts may vary depending on interpretation of the images.)



1. Count how many different species you observe in each site.

Site	Number of species
Left	Higher number
Right	Lower number

Site **left** is likely more resilient because

- It contains a greater variety of species
- Different species perform different ecological roles
- If one species declines, others can help maintain ecosystem balance
- Higher biodiversity increases ecosystem resilience



Ecological Niches and Reef Roles

Every organism on the reef has a specific ecological niche. Sort the species below into the correct ecological group.

Species observed:

- Stoplight parrotfish
- Nassau grouper
- Caribbean reef shark
- Silverside fish
- Sea turtle
- Zooxanthellae

Primary producers	Herbivores	Predators	Apex predators
Zooxanthellae	Spotlight parrotfish	Nassau grouper	Caribbean reef shark
	Sea turtle	Silverside fish	

After a bleaching event, algae begin to grow rapidly.

Which ecological group should increase to restore balance?

Herbivores

Explain your reasoning using evidence from the broadcast.

- Herbivores eat algae
- Increased herbivory helps control algal growth
- This allows corals space and light to recover
- Healthy herbivore populations help reefs recover after bleaching



Investigating Colour, Fish Diversity, and Recovery

CCMI scientists monitor reef health every year using transects and quadrats. After the 2023 bleaching event, some sites recovered faster than others. Scientists investigated whether fish diversity influenced recovery.

Scientists placed a 30 m transect, a measuring line placed along the reef to help scientists count animals and plants, at two reef sites.

Fish Group	Site A	Site B
Herbivores	48	15
Planktivores	32	10
Mid-level predators	20	6
Apex predators	5	0
Total number	105	31

1. Calculate total number of fish at each site and add it to the table.
2. Which site has higher fish diversity? **Site A**
3. Which site will recover faster from bleaching and why?

Site A

- Higher fish diversity supports ecosystem balance
- Herbivores control algae growth
- Predators help maintain healthy food webs
- Diverse ecosystems are more resilient to disturbance

They also investigated how coral recovered between 2024 and 2025.

Site	2024 coral cover	2025 coral cover	Percentage increase
A	11%	18%	64%
B	10%	12%	20%



1. Calculate the percentage increase in coral cover at each site and add it to the table

How to calculate percentage increase

Step 1: Find how much coral cover increased.

Example (Site A): $18\% - 11\% = 7\%$ increase

Step 2: Compare the increase to the starting amount. Example: $7 \div 11 = 0.64$

Step 3: Convert to a percentage. $0.64 \times 100 = 64\%$ increase

Site A increased by 64%.

Now try Site B Find the increase: $12\% - 10\% = 2$

Divide by the starting value: $2 \div 10 = 0.2$

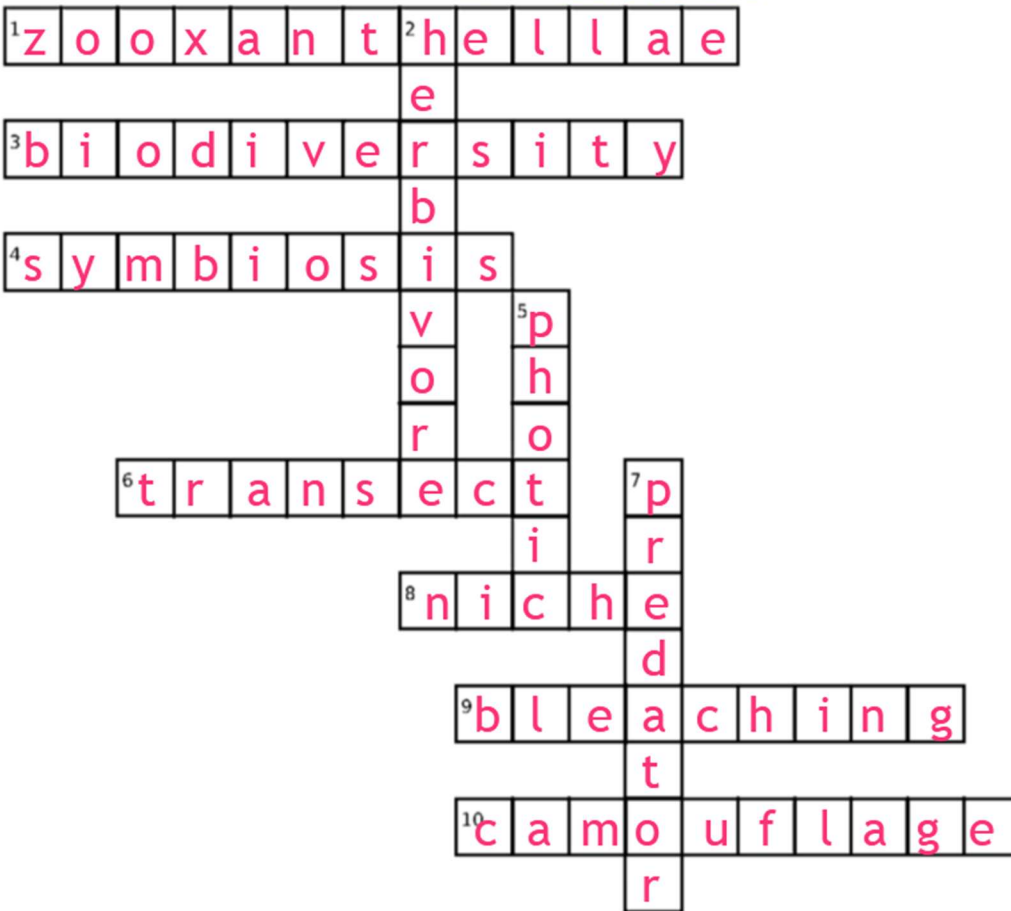
Multiply by 100: percentage increase = **20 %**

2. Which site recovered more strongly?

Site A

3. How might herbivore diversity explain this pattern?

- **Site A has many more herbivores**
- **Herbivores eat algae that grow after bleaching**
- **This prevents algae from covering coral surfaces**
- **Corals therefore have space and light to regrow**



Across	Down
1. Symbiotic algae that live in the tissues of coral polyps that provides the coral with energy and nutrients.	2. Animal that gets its energy from only eating primary producers such as algae and plants
3. All the different living organisms within a given area	5. Surface layer of the ocean where sunlight penetrates; top 500 ft or so
4. Interaction between two organisms where at least one of the organisms benefit; however, the other may suffer, be unaffected, or benefit as well	7. Animal that hunts and eats other animals
6. A measuring line scientists place along the reef to count animals and plants	
8. The specific role an organism plays within an ecosystem	
9. Process of corals appearing white, due to the loss of the algae living inside of them	
10. Colour and/or patterns of an organism that helps it to blend in with the surrounding environment	